



U.S. Department  
of Transportation  
**Federal Highway**

**Administration**

400 Seventh St., S.W.  
Washington, D.C.  
20590

Refer to: HSA-10/SS-96

MR. Jason Davenport  
Utility Structural Systems  
2201 N.Collins Street, Suite 240  
Arlington, TX 76011

Dear Mr. Davenport:

This is in response to the May 11 letter from your company requesting Federal Highway Administration (FHWA) acceptance of your company's Poly-Set HD as foundation material for use with breakaway sign post systems on the National Highway System (NHS). Accompanying your letter was a video of the installation of a small sign post using your company's material and an April 30 letter from Mr. Roger Bligh of the Texas Transportation Institute (TTI) transmitting information on crash testing conducted for the State of Texas on a slip base sign support system using Poly-Set. The final test report was unavailable at the time. Subsequently, on August 21 you met with Mr. Nicholas Artimovich of my staff to discuss your product and possible applications including breakaway wood posts.

#### **Introduction**

Requirements for breakaway supports are those in the American Association of State Highway and Transportation Officials' (AASHTO) Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. Crash testing of breakaway supports is covered in the National Cooperative Highway Research Program (NCHRP) Report 350, Recommended Procedures for the Safety Performance Evaluation of Highway Features.

The Poly-Set HD is an engineered backfill that is a specially modified, high density, polyurethane product. It expands up to 8.5 times its original volume by transforming the two-part liquid components into a solid foundation material in minutes. Information on compressive strength, density, and tensile properties of the tested material were provided for our files.

Full-scale automobile testing was conducted at TTI on a single support omni-directional slip base installation with a 72.2 mm (3-inch) diameter schedule 40 steel pipe support. Two tests were run, at 35 km/h and at 100 km/h using Poly-Set HD foam backfill foundation material. The size of the foundation was 305 mm diameter by 1060 mm deep (12 inches x 42 inches). Since slip base sign supports depend upon rigid foundations to perform as intended, expanding foam backfill materials need to be strong enough to resist crushing in order to provide this acceptable foundation.

The low- and high-speed crash tests both resulted in occupant impact speeds of 1.1 m/s, well under the 5.0 m/s maximum as specified in NCHRP Report 350. The test articles did not show any potential for penetrating the passenger compartment, and there was no observable distress or

movement of the foam foundation material. Based on these tests the State of Texas approved use of your company's product. We also concur that Poly-Set HD is an acceptable foundation material for breakaway small sign support systems such as omni-directional three-bolt slip bases. Therefore, Poly-Set HD is acceptable for use when backfilling certain breakaway small sign supports mounted in standard soil conditions on the NHS under the range of conditions tested, when proposed by a State. The acceptable sign support systems are the tested omni-directional slip base and the following wood post systems:

Wood post size (nominal)	Number of Posts acceptable	Size of holes required **
4x4	1	None
4x4	2	None
4x6	1	1 ½ inches
4x6	2	1 ½ inches
6x8	1	3 inches

\*Number of such posts permitted within a 2.1 m (7-foot span.)

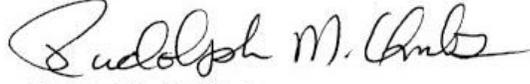
\*\* Holes are to be drilled into the long side of the post (the side that is parallel to traffic) and at heights of 4 inches and 18 inches above the ground.

Please note the following standard provisions which apply to FHWA letters of acceptance:

- Our acceptance is limited to the crashworthiness characteristics of the devices and does not cover their structural features, nor conformity with the Manual on Uniform Traffic Control Devices.
- Any changes that may adversely influence the crashworthiness of the device will require a new acceptance letter.
- Should the FHWA discover that the qualification testing was flawed, that in-service performance reveals unacceptable safety problems, or that the product being marketed is significantly different from the version that was used in the crash tests, it reserves the right to modify or revoke its acceptance.
- You will be expected to supply potential users with sufficient information on design and installation requirements to ensure proper performance.
- You will be expected to certify to potential users that the material furnished has essentially the same chemistry and mechanical properties as that submitted for acceptance, and that they will meet the crashworthiness requirements of FHWA and NCHRP Report 350. Potential users may contact the FHWA Office of Safety Design to confirm that the material properties are comparable to those of the tested product.
- To prevent misunderstanding by others, this letter of acceptance, designated as number SS-96 shall not be reproduced except in full. As this letter and the supporting documentation which support it become public information, it will be available for inspection at our office by interested parties.
- Poly-Set foam backfill material is a patented product and is considered "proprietary." The use of proprietary devices specified on Federal-aid projects, except exempt, non-NHS projects: (a) must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with existing highway facilities or that no equally suitable alternative exists or; (c) they must be used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. Our regulations concerning

proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411, a copy of which is enclosed.

Sincerely yours,



Frederick G. Wright, Jr.  
Program Manager, Safety

*for*

Sec. 635.411 Material or product selection.

(a) Federal funds shall not participate, directly or indirectly, in payment for any premium or royalty on any patented or proprietary material, specification, or process specifically set forth in the plans and specifications for a project, unless:

(1) Such patented or proprietary item is purchased or obtained through competitive bidding with equally suitable unpatented items; or

(2) The State highway agency certifies either that such patented or proprietary item is essential for synchronization with existing highway facilities, or that no equally suitable alternate exists; or

(3) Such patented or proprietary item is used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes.

(b) When there is available for purchase more than one nonpatented, nonproprietary material, semifinished or finished article or product that will fulfill the requirements for an item of work of a project and these available materials or products are judged to be of satisfactory quality and equally acceptable on the basis of engineering analysis and the anticipated prices for the related item(s) of work are estimated to be approximately the same, the PS&E for the project shall either contain or include by reference the specifications for each such material or product that is considered acceptable for incorporation in the work. If the State highway agency wishes to substitute some other acceptable material or product for the material or product designated by the successful bidder or bid as the lowest alternate, and such substitution results in an increase in costs, there will not be Federal-aid participation in any increase in costs.

(c) A State highway agency may require a specific material or product when there are other acceptable materials and products, when such specific choice is approved by the Division Administrator as being in the public interest. When the Division Administrator's approval is not obtained, the item will be nonparticipating unless bidding procedures are used that establish the unit price of each acceptable alternative. In this case Federal-aid participation will be based on the lowest price so established.

(d) Appendix A sets forth the FHWA requirements regarding (1) the specification of alternative types of culvert pipes, and (2) the number and types of such alternatives which must be set forth in the specifications for various types of drainage installations.

(e) Reference in specifications and on plans to single trade name materials will not be approved on Federal-aid contracts.